

# PATENT ABSTRACTS OF JAPAN

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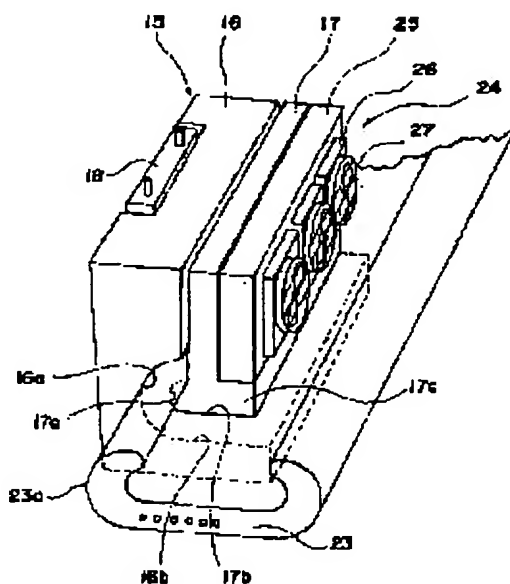
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## (54) REPAIR POT DEVICE FOR MOVING HANDRAIL OF PASSENGER CONVEYER

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a repair pot device for a moving handrail of a passenger conveyer capable of realizing miniaturization and lightening of weight also shortening the time required for temperature control of a repair pot.

**SOLUTION:** A repair pot 15 has a mold structure interposing a repair part coated with decorative rubber in the vicinity of one lug part 23a generating damage of crack or the like of a moving handrail 23 by tightening with a bolt an outer mold 16 formed with a hollow curved surface 16a and a flat surface 16b and an inner mold 17 formed with a protrusive curved surface 17a and a flat surface 17b, also a heating means including a thermo-switch 18 preventing overheat of the repair pot 15 and a nichrome heater heating the repair pot 15 is provided in the outer mold 16, and a cooling means 24 including a Peltier element 26 cooling the repair pot 15 and a fan 27 making heat escape of the Peltier element 26 is provided capable of being mounted/ removed in the inner mold 17.



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**CLAIMS**

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**[Claim(s)]**

[Claim 1] While heating said migration handrail pinched by the repair iron pot by which the migration handrail of the PAX conveyor which has the handle part by which curve formation is carried out is pinched by each of a right-and-left flank, and this repair iron pot In the repair iron pot equipment of the migration handrail of the PAX conveyor which has a heating means to heat the makeup rubber with which the repair part of said migration handrail is equipped Repair iron pot equipment of the migration handrail of the PAX conveyor characterized by having the mold structure where said repair iron pot pinches near the handle part formed in one flank of said handle parts of said migration handrail.

[Claim 2] The dies body which said mold structure equips with the concave bend side along the convex surface which forms the outside of said handle part, and the flat side along the flat side of the outside formed successively by said handle part of said migration handrail, Repair iron pot equipment of the migration handrail of the PAX conveyor according to claim 1 characterized by including a mold while it has a convex surface along the concave bend side which forms the inside of said handle part, and a flat side along the flat side of the inside formed successively by said handle part of said migration handrail.

[Claim 3] Repair iron pot equipment of the migration handrail of the PAX conveyor according to claim 1 or 2 characterized by preparing the thermo switch which prevents overheating of said repair part by said heating means.

[Claim 4] Repair iron pot equipment of the migration handrail of the PAX conveyor according to claim 1 to 3 characterized by having been prepared in said repair iron pot removable, and establishing a cooling means to cool said repair part.

[Claim 5] Repair iron pot equipment of the migration handrail of the PAX conveyor according to claim 4 by which said cooling means is characterized by including a Peltier device.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Field of the Invention]** This invention relates to the repair iron pot equipment of the migration handrail of the suitable PAX conveyor for the repair activity of the migration handrail of a PAX conveyor.

**[0002]**

**[Description of the Prior Art]** The migration handrail of a PAX conveyor produces damage by the crack which occurs spontaneously in many years past, degradation of a joint, etc. Thus, when a migration handrail produces damage, the operator is made to give first-aid treatment to the migration handrail which produced this damage so that it can be equal to use of a predetermined period (about two months) until it exchanges this migration handrail for a new migration handrail.

**[0003]** As mentioned above, the repair iron pot equipment of the migration handrail of the conventional PAX conveyor used for the repair activity of the migration handrail which gives the first-aid treatment of the migration handrail which produced damage is based and explained in a Fig. below.

**[0004]** Drawing 5 is the perspective view showing the repair iron pot equipment of the migration handrail of the conventional PAX conveyor.

**[0005]** As shown in drawing 5, the repair iron pot 1 with an overall length of 1000mm and this repair iron pot 1 are contained, and conventional repair iron pot equipment mainly consists of a conveyance case 7 which is the overall length of 1200mm, and a controller box 8 which controls the repair iron pot 1. The repair iron pot 1 has the punch 2 which binds tight the medium size 3 set to a migration handrail, and the medium size 3 set to this migration handrail and this migration handrail, and pinches a bolt 6 and female mold 3, and the connector 5 to which power is supplied. Moreover, each of the thermistor temperature sensor 10 which checks whenever [ connector / which is connected to the connector 5 of the repair iron pot 1 / 9 plug socket / which is connected to the 200 volt power source prepared in the machine room of a PAX conveyor / 11, and stoving temperature / of the repair iron pot 1 ] is connected to the control box 8 which adjusts the temperature at the time of heating of the repair iron pot 1 through cables 12, 13, and 14.

**[0006]** With the conventional repair equipment constituted, a repair activity [ a PAX conveyor, for example, the migration handrail of an escalator, ] is faced. Thus, an operator Before doing the repair activity, a migration handrail is removed from a guide rail. makeup rubber is embedded in the repair part which deleted near the damage section (for example, near [ of the handle parts of a right-and-left flank by which are alike, respectively and curve formation is carried out / one ] a near handle part) by the cutter, produced the repair part, and was produced in this way, and it sets to the repair iron pot 1 which carried out like the after-mentioned and finished preparation.

**[0007]** In preparing the repair iron pot 1, an operator lays the repair iron pot 1 on the step near [ for repair ] a migration handrail, connects to the connector 5 of the repair iron pot 1 the connector 9 connected to the controller box 8 through a cable 12, and sets the thermistor temperature sensor 10 to the predetermined part of the repair iron pot 1. And an operator opens the bottom plate of the machine room of an escalator, constructs electric wiring which draws a 200-volt power power source from the control panel in the machine room, connects a plug socket 11 to the terminal prepared by this, switches on a power source, and heats the repair iron pot 1 beforehand at about 100 degrees.

**[0008]** After this preheating completed and carries out, with the condition that the migration handrail which includes a repair part in the female mold 4 of the repair iron pot 1 is attached by the guide rail, an operator stores so that both sides may be in a reverse condition, he sets a medium size 3 to this migration handrail, puts a punch 2 on it, and a bolt 6 binds a medium size 3 and a migration handrail tight, and he pinches them with a punch 2 and female mold 4. And the controller box 8 is operated checking the temperature of the repair iron pot 1 with a thermistor temperature sensor, predetermined carries out time amount maintenance just over or below 135 degrees, and the repair iron pot 1 is

vulcanized. That is, the vulcanization activity which heats and melts makeup rubber and is familiarized with a repair part is done.

[0009] An operator turns off the repair iron pot 1 and makes this repair iron pot 1 radiate heat after this vulcanization activity termination. Or the repair iron pot 1 is made to hang and cool the clean cloth soaked in water.

[0010] If the repair iron pot 1 and a migration handrail are cooled enough, it will check that an operator removes a migration handrail from the repair iron pot 1, attaches in a guide rail, make a test run of an escalator, and it is normal.

[0011]

[Problem(s) to be Solved by the Invention] By the way, as the conventional repair iron pot equipment mentioned above is shown in drawing 5, the overall length of the repair iron pot 1 is [ the overall length of 1000mm and a conveyance case ] 1200mm, and weight has become 50kg or more per set. In addition, in order to make it correspond to the configuration of a migration handrail, large-sized Shigekazu Taka's repair iron pot is prepared in some numbers beforehand, and in order to make it correspond promptly in a repair site, he is trying to bring all of the repair iron pot of these some kinds. Therefore, a remarkable burden starts an operator only by carrying a repair iron pot. In addition, three or more operators are usually needed for conveyance of this repair iron pot.

[0012] Moreover, although it is generating in one handle part of this migration handrail in most cases and a repair part will be produced near [ one ] a handle part in connection with this, to such a repair part, by the former, the crack generated to a migration handrail will have the too large repair iron pot 1, therefore will require time amount (about 6 hours) for temperature management of the preheating of this repair iron pot, heating, cooling, etc.

[0013] In addition, it was the case where there were two or more parts which need repair, and in order to terminate a repair activity within the limited time amount, such as night, each kind of repair iron pot had to be prepared two or more sets, and the burden of the conveyance to an operator was increasing further.

[0014] Moreover, since the heating range is large, if repair of a migration handrail goes wrong, the situation which must exchange the whole migration handrail immediately will arise.

[0015] The purpose of this invention is to offer the repair iron pot equipment of the migration handrail of the PAX conveyor who can shorten the time amount which temperature management of a repair iron pot takes while being able to realize small lightweight-ization.

[0016]

[Means for Solving the Problem] In order to attain the purpose of this invention, invention concerning claim 1 of this invention While heating said migration handrail pinched by the repair iron pot by which the migration handrail of the PAX conveyor which has the handle part by which curve formation is carried out is pinched by each of a right-and-left flank, and this repair iron pot In the repair iron pot equipment of the migration handrail of the PAX conveyor which has a heating means to heat the makeup rubber with which the repair part of said migration handrail is equipped, said repair iron pot is made the configuration which has the mold structure which pinches near the handle part formed in one flank of said handle parts of said migration handrail.

[0017] Thus, in invention concerning constituted claim 1, since damage on a migration handrail is the structure which while occurs mostly and pinches only the repair part near a handle part, while the structure of a repair iron pot can realize the repair activity for which it asked, a miniaturization and lightweight-izing of a repair iron pot are realizable. Moreover, with implementation of a miniaturization of this repair iron pot, there can be little heat capacity required at the time of heating of a repair iron pot, it can end, and a preheating and the time amount which can heat, and can also perform cooling of a repair iron pot in a short time, therefore temperature management of a repair iron pot takes can be shortened for a repair iron pot for a short time.

[0018] Moreover, the concave bend side where said mold structure meets the convex surface of said handle part which carries out outside formation in invention which invention concerning claim 2 requires for claim 1, It is characterized by including a mold, while it has a dies body equipped with the flat side along the flat side of the outside formed successively by said handle part of said migration handrail, a convex surface along the concave bend side which forms the inside of said handle part, and a flat side along the flat side of the inside formed successively by said handle part of said migration handrail.

[0019] Moreover, invention concerning claim 3 is characterized by preparing the thermo switch which prevents overheating of said repair part by said heating means in invention concerning claim 1 or claim 2.

[0020] In invention concerning such a claim 3, an operator can prevent automatically past [ of the temperature of the repair iron pot at the time of vulcanization of a repair part / a riser ] by making a temperature setup of a thermo switch not become beyond temperature predetermined in the temperature of a repair iron pot.

[0021] Moreover, invention concerning claim 4 is characterized by having been prepared in said repair iron pot removable, and establishing a cooling means to cool said repair part in invention concerning either claim 1 thru/or

claim 3.

[0022] In invention concerning such a claim 4, a repair iron pot can be compulsorily cooled by cooling a repair iron pot with a cooling means in a short time.

[0023] Moreover, invention concerning claim 5 requires with the description that said cooling means contains a Peltier device in invention concerning claim 4.

[0024]

[Embodiment of the Invention] Hereafter, 1 operation gestalt of the repair iron pot equipment of the migration handrail of the PAX conveyor of this invention is explained based on drawing.

[0025] The perspective view showing the condition before implementation of the vulcanization activity done using 1 operation gestalt which shows the side elevation showing the whole 1 operation gestalt configuration which shows the perspective view in which drawing 1 shows the important section of 1 operation gestalt of this invention, and drawing 2 to drawing 1, and drawing 3 to drawing 1, and drawing 4 are the side elevation the condition at the time of implementation of the vulcanization activity done using 1 operation gestalt shown in drawing 1 is shown.

[0026] The dies body 16 to which 1 operation gestalt of this invention pinches the repair part of the migration handrail 23 of the PAX conveyor which has produced the damage on a crack etc. as shown in drawing 1 and drawing 2, and the inside mold 17, While preheating and heating the repair iron pot 15 which has the bolt 22 which concludes these dies bodies 16 and inside molds 17, and this repair iron pot 15 The makeup rubber which covers the damage on the crack with which the repair part and its repair part of the migration handrail 23 were equipped through this repair iron pot 15 and which is not illustrated is heated. The heating means 19 which can use a 100-volt electric light power source, It has a cooling means 24 to cool the repair part where the migration handrail 23 was heated through the repair iron pot 15, and the makeup rubber which is not illustrated.

[0027] Concave bend side 16a along the convex surface which forms in the dies body 16 of the repair iron pot 15 the outside of one handle part 23a of the two handle parts prepared in both sides, Flat side 16b along a part of flat side of the outside which stands in a row in the handle part 23a is formed, and flat side 17b along a part of flat side of the inside which stands in a row in convex surface 17a along the concave bend side which forms the inside of handle part 23a, and its handle part 23a is formed in the inner mold 17. Moreover, tapped hole screwed with this bolt 22 at inner mold 17 22b which lets a bolt 22 pass is prepared in the dies body 16 by through-tube 22a Preparing. These dies bodies 16 and the inside mold 17 constitute the mold structure which pinches the repair part formed in one handle part 23a by concluding a bolt 22. Moreover, in order to arrange the fixed piece 25 of a cooling means 24 to mention later, lobe 17c which projects perpendicularly mostly to the side face in which tapped hole 22b of the inner mold 17 was prepared is prepared in the location of the opposite side of convex surface 17a of the inner mold 17. Moreover, as shown in drawing 3, the repair iron pot 15 consists for example, of aluminum material, and an overall length is set as L (for example, 250mm), it has set the width method as T (<L), and weight is held down to about 5kg.

[0028] Moreover, a 100-volt electric light power source is used for the heating means 19, and the switch 21 which \*\*\*\* between the power source, and the temperature of the repair iron pot 15 are equipped with the thermo switch 18 which consists of the bimetal which prevents overheating so that 140 degrees may not be exceeded, Nichrome heater 19A which heats the repair iron pot 15, and the plug socket 20 for 100-volt power-source connection.

[0029] Moreover, the cooling means 24 is equipped with the plug socket 28 which connects the fan, the fixed piece 25 which is prepared in a mold 17 removable among the repair iron pots 15, for example, consists of an aluminum plate, and the cooling object 26, for example, the Peltier device, attached in this fixed piece 25, 27 who misses the heat of this Peltier device 26, Peltier device 26 and a fan 27, and a power source.

[0030] thus, with 1 operation gestalt of constituted this invention It faces a repair activity [ the PAX conveyor 23, for example, the migration handrail of an escalator, ]. An operator Before doing the repair activity of the migration handrail 23, the migration handrail 23 is removed from a guide rail, and the bench is fixed on the guide rail located in position at the interstitial segment of for example, up \*\*\*\* and lower \*\*\*\*. On this bench Delete near handle part 23a by the cutter, and while having produced damage on the migration handrail 23 produces a repair part (field to repair). embeds so that it equips with the makeup rubber which is not illustrated in the repair part produced near this handle part 23a, namely, this repair part may be covered with makeup rubber and it may be easy to weld.

[0031] In preparing the repair iron pot 15, an operator removes the migration handrail 23 from the bench, and lays the repair iron pot 15 in the above-mentioned bench in the condition of having removed the cooling means 24 as shown in drawing 3. And an operator inserts in a 100-volt predetermined electric light power source the plug socket 20 shown in drawing 4, turns ON a switch 21, and heats the repair iron pot 15 beforehand at about 100 degrees. In addition, a thermo switch 18 will be in an operating state at this time.

[0032] After an above-mentioned preheating is completed, an operator includes a repair part, and it changes into the

condition that both sides become reverse, while includes this repair part, and he makes handle part 23a arrange and pinch between a dies body 16 and the inside mold 17 with the condition that the migration handrail 23 which has handle part 23a is usually attached by the guide rail, as shown in drawing 4 .

[0033] In making handle part 23a of one of these pinch with a dies body 16 and the inside mold 17, an operator makes the convex surface which forms the outside of handle part 23a contact concave bend side 16a of a dies body 16, and lays the flat side of the outside which stands in a row in the convex surface of this handle part 23a on flat side 16b of a dies body 16. Moreover, convex surface 17a of the inner mold 17 is made to contact the concave bend side which forms the inside of handle part 23a, and flat side 17b of the inner mold 17 is made to contact the flat side of the inside which stands in a row in the concave bend side of this handle part 23a. Thus, while includes a repair part, while includes a repair part with a dies body 16 and the inside mold 17, and handle part 23a is made to make a bolt 22 screw in tapped hole 22b of through and the inner mold 17 from through tube 22a of a dies body 16, to bind tight, and to pinch in the condition of having made the dies body 16 and the inside mold 17 contacting handle part 23a.

[0034] And the repair iron pot 15 is heated by Nichrome heater 19A with which the heating means 19 was equipped, and the makeup rubber which covered the repair part by this is heated. If the repair iron pot 15 is heated till around 130 degrees, the activity to which predetermined carries out time amount maintenance of the temperature of the repair iron pot 15 in the condition around 135 degrees, and it vulcanizes, i.e., makeup rubber, will be heated and melted, and the vulcanization activity familiarized with a supplementary-lessons part will be done. In addition, when the temperature of the repair iron pot 15 exceeds 140 degrees during this vulcanization activity, a thermo switch 18 is turned off, heating at the Nichrome heater 19 stops, and overheating of the repair iron pot 15 is prevented.

[0035] An operator turns OFF the switch 21 of the heating means 19 after this vulcanization activity termination. As heating by (Nichrome heater 19A is made to contact the field where the fixed piece 25 of the cooling means 24 was formed in the top face of lobe 17c of the inner mold 17, and tapped hole 22b of the inner mold 17 as shown in half) next drawing 1 , and drawing 2 , this cooling means 24 is attached in the inner mold 17, and a plug socket 28 is connected to a predetermined power source. Peltier device 26 and a fan 27 operate by this, the repair iron pot 15 is cooled, and the makeup rubber welded with \*\*\*\*\* of the migration handrail 23 and heating is cooled. In addition, at this time, Peltier device 26 absorbs the heat of the repair iron pot 15 in respect of touching the fixed piece 25, is a field by the side of a fan 27, and radiates heat in this absorbed heat. The fan 27 is urging heat dissipation of this Peltier device 26.

[0036] As mentioned above, if the repair part of the repair iron pot 15 and the migration handrail 23 is cooled and the repair part of these repair iron pots 15 and the migration handrail 23 is fully cooled, by loosening a bolt 22, the inside mold 17 will be removed and an operator will remove the migration handrail 23 from the repair iron pot 15. Next, the bench is removed from a guide rail and the migration handrail 23 repaired to the guide rail is attached again. It checks that it makes a test run of an escalator, and there is finally more than [ no ].

[0037] Thus, according to 1 constituted operation gestalt, since the structure of the repair iron pot 15 pinched only the repair part near [ one ] handle part 23a of the migration handrail 23 While being able to realize the repair activity for which it asked, an overall length L can set the magnitude of a repair iron pot as about 250mm and the small thing whose width method T is about [ conventional ] 1/2, and miniaturization and lightweight-ization can be realized. Therefore, since an operator can arrange the repair iron pot 15 on the bench prepared on the guide rail comparatively easily and can arrange this repair iron pot 15 by one person, he can raise workability. Moreover, it is also possible to be also able to perform conveyance easily, and for it not to be necessary to arrange the special car for heavy-lift conveyance, and to contain and carry in a bag etc. Therefore, conveyance costs can be reduced while being able to raise the efficiency of conveyance.

[0038] Moreover, with implementation of a miniaturization of this repair iron pot 15, there is little heat capacity required at the time of heating of the repair iron pot 15, and it ends, and the repair iron pot 15 can be substituted in a short time, it can heat, and the repair iron pot 15 can be cooled in a short time, and a preheating and the time amount which temperature management of the repair iron pot 23 takes by these can be substituted for short time amount. Moreover, when there is little heat capacity and it ends, a 100-volt electric light power source can be used for the power source of Nichrome heater 19A, and it is not necessary to construct electric wiring which establishes a power source in the machine room of an escalator. Therefore, working capacity can be raised also in these points.

[0039] Moreover, since the thermo switch 18 was formed in the heating means 24 and overheating of the repair iron pot 15 was prevented automatically, the precision of temperature management of the repair iron pot 15 can be kept high, therefore working capacity can be raised also in this point. Moreover, failure of the repair produced by overheating of the migration handrail 23 can be prevented, and an operator's mental burden can be made to mitigate.

[0040] Moreover, since the cooling means 24 which contains Peltier device 26 in the repair iron pot 15 was established

removable, the repair part of the repair iron pot 15 and the migration handrail 23 can be cooled compulsorily in a short time. Therefore, also at this point, the time amount which temperature management of a repair activity takes can be shortened, and working capacity can be raised further.

[0041] In addition, the time amount which the repair activity per repair part of the migration handrail 23 takes can also carry out sequential repair of two or more parts by one set of the repair iron pot 15, even when it can be managed in 3 hours from 2 hours as mentioned above, therefore two or more places must be repaired within the limited time amount such as night.

[0042]

[Effect of the Invention] As mentioned above, invention concerning each claim can realize small lightweight-ization of a repair iron pot, thereby, an operator can arrange the repair iron pot in a repair site comparatively easily, and it is possible for at least one person to arrange a repair iron pot in a repair site. Therefore, working capacity can be raised. Moreover, conveyance of a repair iron pot can also be performed easily and containing and carrying in a bag etc. is also possible. Therefore, the efficiency of conveyance can be raised.

[0043] Moreover, the preheating of a repair iron pot, heating, and temperature management of cooling can be performed in a short time, and working capacity can be raised compared with the former also at this point. Moreover, there are few heating values to be used, they end, can heat a repair iron pot with small power, and are rich in economical efficiency.

[0044] Moreover, by preventing overheating of a repair iron pot automatically, especially invention concerning claim 1 can keep high the precision of temperature management of a repair iron pot, and can raise working capacity also in this point. Moreover, failure of the repair produced by overheating of a repair iron pot can be prevented, and, thereby, an operator's mental burden can be made to mitigate.

[0045] Moreover, especially invention concerning claim 4 or claim 5 can cool compulsorily the repair part of a repair iron pot and a migration handrail in a short time, and can shorten the time amount which temperature management of a repair iron pot takes. Therefore, working capacity can be raised also in this point.

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TECHNICAL FIELD

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[Field of the Invention] This invention relates to the repair iron pot equipment of the migration handrail of the suitable PAX conveyor for the repair activity of the migration handrail of a PAX conveyor.

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PRIOR ART

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[Description of the Prior Art] The migration handrail of a PAX conveyor produces damage by the crack which occurs spontaneously in many years past, degradation of a joint, etc. Thus, when a migration handrail produces damage, the operator is made to give first-aid treatment to the migration handrail which produced this damage so that it can be equal to use of a predetermined period (about two months) until it exchanges this migration handrail for a new migration handrail.

[0003] As mentioned above, the repair iron pot equipment of the migration handrail of the conventional PAX conveyor used for the repair activity of the migration handrail which gives the first-aid treatment of the migration handrail which produced damage is based and explained in a Fig. below.

[0004] Drawing 5 is the perspective view showing the repair iron pot equipment of the migration handrail of the conventional PAX conveyor.

[0005] As shown in drawing 5, the repair iron pot 1 with an overall length of 1000mm and this repair iron pot 1 are contained, and conventional repair iron pot equipment mainly consists of a conveyance case 7 which is the overall length of 1200mm, and a controller box 8 which controls the repair iron pot 1. The repair iron pot 1 has the punch 2 which binds tight the medium size 3 set to a migration handrail, and the medium size 3 set to this migration handrail and this migration handrail, and pinches a bolt 6 and female mold 3, and the connector 5 to which power is supplied. Moreover, each of the thermistor temperature sensor 10 which checks whenever [ connector / which is connected to the connector 5 of the repair iron pot 1 / 9 plug socket / which is connected to the 200 volt power source prepared in the machine room of a PAX conveyor / 11, and stoving temperature / of the repair iron pot 1 ] is connected to the control box 8 which adjusts the temperature at the time of heating of the repair iron pot 1 through cables 12, 13, and 14.

[0006] With the conventional repair equipment constituted, a repair activity [ a PAX conveyor, for example, the migration handrail of an escalator, ] is faced. Thus, an operator Before doing the repair activity, a migration handrail is removed from a guide rail. makeup rubber is embedded in the repair part which deleted near the damage section (for example, near [ of the handle parts of a right-and-left flank by which are alike, respectively and curve formation is carried out / one ] a near handle part) by the cutter, produced the repair part, and was produced in this way, and it sets to the repair iron pot 1 which carried out like the after-mentioned and finished preparation.

[0007] In preparing the repair iron pot 1, an operator lays the repair iron pot 1 on the step near [ for repair ] a migration handrail, connects to the connector 5 of the repair iron pot 1 the connector 9 connected to the controller box 8 through a cable 12, and sets the thermistor temperature sensor 10 to the predetermined part of the repair iron pot 1. And an operator opens the bottom plate of the machine room of an escalator, constructs electric wiring which draws a 200-volt power power source from the control panel in the machine room, connects a plug socket 11 to the terminal prepared by this, switches on a power source, and heats the repair iron pot 1 beforehand at about 100 degrees.

[0008] After this preheating completed and carries out, with the condition that the migration handrail which includes a repair part in the female mold 4 of the repair iron pot 1 is attached by the guide rail, an operator stores so that both sides may be in a reverse condition, he sets a medium size 3 to this migration handrail, puts a punch 2 on it, and a bolt 6 binds a medium size 3 and a migration handrail tight, and he pinches them with a punch 2 and female mold 4. And the controller box 8 is operated checking the temperature of the repair iron pot 1 with a thermistor temperature sensor, predetermined carries out time amount maintenance just over or below 135 degrees, and the repair iron pot 1 is vulcanized. That is, the vulcanization activity which heats and melts makeup rubber and is familiarized with a repair part is done.

[0009] An operator turns off the repair iron pot 1 and makes this repair iron pot 1 radiate heat after this vulcanization activity termination. Or the repair iron pot 1 is made to hang and cool the clean cloth soaked in water.

[0010] If the repair iron pot 1 and a migration handrail are cooled enough, it will check that an operator removes a

migration handrail from the repair iron pot 1, attaches in a guide rail, make a test run of an escalator, and it is normal.  
[0011]

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## EFFECT OF THE INVENTION

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[Effect of the Invention] As mentioned above, invention concerning each claim can realize small lightweight-ization of a repair iron pot, thereby, an operator can arrange the repair iron pot in a repair site comparatively easily, and it is possible for at least one person to arrange a repair iron pot in a repair site. Therefore, working capacity can be raised. Moreover, conveyance of a repair iron pot can also be performed easily and containing and carrying in a bag etc. is also possible. Therefore, the efficiency of conveyance can be raised.

[0043] Moreover, the preheating of a repair iron pot, heating, and temperature management of cooling can be performed in a short time, and working capacity can be raised compared with the former also at this point. Moreover, there are few heating values to be used, they end, can heat a repair iron pot with small power, and are rich in economical efficiency.

[0044] Moreover, by preventing overheating of a repair iron pot automatically, especially invention concerning claim 1 can keep high the precision of temperature management of a repair iron pot, and can raise working capacity also in this point. Moreover, failure of the repair produced by overheating of a repair iron pot can be prevented, and, thereby, an operator's mental burden can be made to mitigate.

[0045] Moreover, especially invention concerning claim 4 or claim 5 can cool compulsorily the repair part of a repair iron pot and a migration handrail in a short time, and can shorten the time amount which temperature management of a repair iron pot takes. Therefore, working capacity can be raised also in this point.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] By the way, as the conventional repair iron pot equipment mentioned above is shown in drawing 5 , the overall length of the repair iron pot 1 is [ the overall length of 1000mm and a conveyance case ] 1200mm, and weight has become 50kg or more per set. In addition, in order to make it correspond to the configuration of a migration handrail, large-sized Shigekazu Taka's repair iron pot is prepared in some numbers beforehand, and in order to make it correspond promptly in a repair site, he is trying to bring all of the repair iron pot of these some kinds. Therefore, a remarkable burden starts an operator only by carrying a repair iron pot. In addition, three or more operators are usually needed for conveyance of this repair iron pot.

[0012] Moreover, although it is generating in one handle part of this migration handrail in most cases and a repair part will be produced near [ one ] a handle part in connection with this, to such a repair part, by the former, the crack generated to a migration handrail will have the too large repair iron pot 1, therefore will require time amount (about 6 hours) for temperature management of the preheating of this repair iron pot, heating, cooling, etc.

[0013] In addition, it was the case where there were two or more parts which need repair, and in order to terminate a repair activity within the limited time amount, such as night, each kind of repair iron pot had to be prepared two or more sets, and the burden of the conveyance to an operator was increasing further.

[0014] Moreover, since the heating range is large, if repair of a migration handrail goes wrong, the situation which must exchange the whole migration handrail immediately will arise.

[0015] The purpose of this invention is to offer the repair iron pot equipment of the migration handrail of the PAX conveyor who can shorten the time amount which temperature management of a repair iron pot takes while being able to realize small lightweight-ization.

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MEANS

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[Means for Solving the Problem] In order to attain the purpose of this invention, invention concerning claim 1 of this invention While heating said migration handrail pinched by the repair iron pot by which the migration handrail of the PAX conveyor which has the handle part by which curve formation is carried out is pinched by each of a right-and-left flank, and this repair iron pot In the repair iron pot equipment of the migration handrail of the PAX conveyor which has a heating means to heat the makeup rubber with which the repair part of said migration handrail is equipped, said repair iron pot is made the configuration which has the mold structure which pinches near the handle part formed in one flank of said handle parts of said migration handrail.

[0017] Thus, in invention concerning constituted claim 1, since damage on a migration handrail is the structure which while occurs mostly and pinches only the repair part near a handle part, while the structure of a repair iron pot can realize the repair activity for which it asked, a miniaturization and lightweight-izing of a repair iron pot are realizable. Moreover, with implementation of a miniaturization of this repair iron pot, there can be little heat capacity required at the time of heating of a repair iron pot, it can end, and a preheating and the time amount which can heat, and can also perform cooling of a repair iron pot in a short time, therefore temperature management of a repair iron pot takes can be shortened for a repair iron pot for a short time.

[0018] Moreover, the concave bend side where said mold structure meets the convex surface of said handle part which carries out outside formation in invention which invention concerning claim 2 requires for claim 1, It is characterized by including a mold, while it has a dies body equipped with the flat side along the flat side of the outside formed successively by said handle part of said migration handrail, a convex surface along the concave bend side which forms the inside of said handle part, and a flat side along the flat side of the inside formed successively by said handle part of said migration handrail.

[0019] Moreover, invention concerning claim 3 is characterized by preparing the thermo switch which prevents overheating of said repair part by said heating means in invention concerning claim 1 or claim 2.

[0020] In invention concerning such a claim 3, an operator can prevent automatically past [ of the temperature of the repair iron pot at the time of vulcanization of a repair part / a riser ] by making a temperature setup of a thermo switch not become beyond temperature predetermined in the temperature of a repair iron pot.

[0021] Moreover, invention concerning claim 4 is characterized by having been prepared in said repair iron pot removable, and establishing a cooling means to cool said repair part in invention concerning either claim 1 thru/or claim 3.

[0022] In invention concerning such a claim 4, a repair iron pot can be compulsorily cooled by cooling a repair iron pot with a cooling means in a short time.

[0023] Moreover, invention concerning claim 5 requires with the description that said cooling means contains a Peltier device in invention concerning claim 4.

[0024]

[Embodiment of the Invention] Hereafter, 1 operation gestalt of the repair iron pot equipment of the migration handrail of the PAX conveyor of this invention is explained based on drawing.

[0025] The perspective view showing the condition before implementation of the vulcanization activity done using 1 operation gestalt which shows the side elevation showing the whole 1 operation gestalt configuration which shows the perspective view in which drawing 1 shows the important section of 1 operation gestalt of this invention, and drawing 2 to drawing 1 , and drawing 3 to drawing 1 , and drawing 4 are the side elevation the condition at the time of implementation of the vulcanization activity done using 1 operation gestalt shown in drawing 1 is shown.

[0026] The dies body 16 to which 1 operation gestalt of this invention pinches the repair part of the migration handrail 23 of the PAX conveyor which has produced the damage on a crack etc. as shown in drawing 1 and drawing 2 , and th

inside mold 17, While preheating and heating the repair iron pot 15 which has the bolt 22 which concludes these dies bodies 16 and inside molds 17, and this repair iron pot 15 The makeup rubber which covers the damage on the crack with which the repair part and its repair part of the migration handrail 23 were equipped through this repair iron pot 15 and which is not illustrated is heated. The heating means 19 which can use a 100-volt electric light power source, It has a cooling means 24 to cool the repair part where the migration handrail 23 was heated through the repair iron pot 15, and the makeup rubber which is not illustrated.

[0027] Concave bend side 16a along the convex surface which forms in the dies body 16 of the repair iron pot 15 the outside of one handle part 23a of the two handle parts prepared in both sides, Flat side 16b along a part of flat side of the outside which stands in a row in the handle part 23a is formed, and flat side 17b along a part of flat side of the inside which stands in a row in convex surface 17a along the concave bend side which forms the inside of handle part 23a, and its handle part 23a is formed in the inner mold 17. Moreover, tapped hole screwed with this bolt 22 at inner mold 17 22b which lets a bolt 22 pass is prepared in the dies body 16 by through-tube 22a Preparing. These dies bodies 16 and the inside mold 17 constitute the mold structure which pinches the repair part formed in one handle part 23a by concluding a bolt 22. Moreover, in order to arrange the fixed piece 25 of a cooling means 24 to mention later, lobe 17c which projects perpendicularly mostly to the side face in which tapped hole 22b of the inner mold 17 was prepared is prepared in the location of the opposite side of convex surface 17a of the inner mold 17. Moreover, as shown in drawing 3, the repair iron pot 15 consists for example, of aluminum material, and an overall length is set as L (for example, 250mm), it has set the width method as T (<L), and weight is held down to about 5kg.

[0028] Moreover, a 100-volt electric light power source is used for the heating means 19, and the switch 21 which \*\*\*\* between the power source, and the temperature of the repair iron pot 15 are equipped with the thermo switch 18, which consists of the bimetal which prevents overheating so that 140 degrees may not be exceeded, Nichrome heater 19A which heats the repair iron pot 15, and the plug socket 20 for 100-volt power-source connection.

[0029] Moreover, the cooling means 24 is equipped with the plug socket 28 which connects the fan, the fixed piece 25 which is prepared in a mold 17 removable among the repair iron pots 15, for example, consists of an aluminum plate, and the cooling object 26, for example, the Peltier device, attached in this fixed piece 25, 27 who misses the heat of this Peltier device 26, Peltier device 26 and a fan 27, and a power source.

[0030] thus, with 1 operation gestalt of constituted this invention It faces a repair activity [ the PAX conveyor 23, for example, the migration handrail of an escalator, ]. An operator Before doing the repair activity of the migration handrail 23, the migration handrail 23 is removed from a guide rail, and the bench is fixed on the guide rail located in position at the interstitial segment of for example, up \*\*\*\* and lower \*\*\*\*. On this bench Delete near handle part 23a by the cutter, and while having produced damage on the migration handrail 23 produces a repair part (field to repair). embeds so that it equips with the makeup rubber which is not illustrated in the repair part produced near this handle part 23a, namely, this repair part may be covered with makeup rubber and it may be easy to weld.

[0031] In preparing the repair iron pot 15, an operator removes the migration handrail 23 from the bench, and lays the repair iron pot 15 in the above-mentioned bench in the condition of having removed the cooling means 24 as shown in drawing 3. And an operator inserts in a 100-volt predetermined electric light power source the plug socket 20 shown in drawing 4, turns ON a switch 21, and heats the repair iron pot 15 beforehand at about 100 degrees. In addition, a thermo switch 18 will be in an operating state at this time.

[0032] After an above-mentioned preheating is completed, an operator includes a repair part, and it changes into the condition that both sides become reverse, while includes this repair part, and he makes handle part 23a arrange and pinch between a dies body 16 and the inside mold 17 with the condition that the migration handrail 23 which has handle part 23a is usually attached by the guide rail, as shown in drawing 4.

[0033] In making handle part 23a of one of these pinch with a dies body 16 and the inside mold 17, an operator makes the convex surface which forms the outside of handle part 23a contact concave bend side 16a of a dies body 16, and lays the flat side of the outside which stands in a row in the convex surface of this handle part 23a on flat side 16b of a dies body 16. Moreover, convex surface 17a of the inner mold 17 is made to contact the concave bend side which forms the inside of handle part 23a, and flat side 17b of the inner mold 17 is made to contact the flat side of the inside which stands in a row in the concave bend side of this handle part 23a. Thus, while includes a repair part, while includes a repair part with a dies body 16 and the inside mold 17, and handle part 23a is made to make a bolt 22 screw in tapped hole 22b of through and the inner mold 17 from through tube 22a of a dies body 16, to bind tight, and to pinch in the condition of having made the dies body 16 and the inside mold 17 contacting handle part 23a.

[0034] And the repair iron pot 15 is heated by Nichrome heater 19A with which the heating means 19 was equipped, and the makeup rubber which covered the repair part by this is heated. If the repair iron pot 15 is heated till around 13 degrees, the activity to which predetermined carries out time amount maintenance of the temperature of the repair iron

pot 15 in the condition around 135 degrees, and it vulcanizes, i.e., makeup rubber, will be heated and melted, and the vulcanization activity familiarized with a supplementary-lessons part will be done. In addition, when the temperature of the repair iron pot 15 exceeds 140 degrees during this vulcanization activity, a thermo switch 18 is turned off, heating at the Nichrome heater 19 stops, and overheating of the repair iron pot 15 is prevented.

[0035] An operator turns OFF the switch 21 of the heating means 19 after this vulcanization activity termination. As heating by (Nichrome heater 19A is made to contact the field where the fixed piece 25 of the cooling means 24 was formed in the top face of lobe 17c of the inner mold 17, and tapped hole 22b of the inner mold 17 as shown in (halt) next drawing 1, and drawing 2, this cooling means 24 is attached in the inner mold 17, and a plug socket 28 is connected to a predetermined power source. Peltier device 26 and a fan 27 operate by this, the repair iron pot 15 is cooled, and the makeup rubber welded with \*\*\*\*\* of the migration handrail 23 and heating is cooled. In addition, at this time, Peltier device 26 absorbs the heat of the repair iron pot 15 in respect of touching the fixed piece 25, is a field by the side of a fan 27, and radiates heat in this absorbed heat. The fan 27 is urging heat dissipation of this Peltier device 26.

[0036] As mentioned above, if the repair part of the repair iron pot 15 and the migration handrail 23 is cooled and the repair part of these repair iron pots 15 and the migration handrail 23 is fully cooled, by loosening a bolt 22, the inside mold 17 will be removed and an operator will remove the migration handrail 23 from the repair iron pot 15. Next, the bench is removed from a guide rail and the migration handrail 23 repaired to the guide rail is attached again. It checks that it makes a test run of an escalator, and there is finally more than [ no ]:

[0037] Thus, according to 1 constituted operation gestalt, since the structure of the repair iron pot 15 pinched only the repair part near [ one ] handle part 23a of the migration handrail 23 While being able to realize the repair activity for which it asked, an overall length L can set the magnitude of a repair iron pot as about 250mm and the small thing whose width method T is about [ conventional ] 1/2, and miniaturization and lightweight-ization can be realized. Therefore, since an operator can arrange the repair iron pot 15 on the bench prepared on the guide rail comparatively easily and can arrange this repair iron pot 15 by one person, he can raise workability. Moreover, it is also possible to be also able to perform conveyance easily, and for it not to be necessary to arrange the special car for heavy-lift conveyance, and to contain and carry in a bag etc. Therefore, conveyance costs can be reduced while being able to raise the efficiency of conveyance.

[0038] Moreover, with implementation of a miniaturization of this repair iron pot 15, there is little heat capacity required at the time of heating of the repair iron pot 15, and it ends, and the repair iron pot 15 can be substituted in a short time, it can heat, and the repair iron pot 15 can be cooled in a short time, and a preheating and the time amount which temperature management of the repair iron pot 23 takes by these can be substituted for short time amount. Moreover, when there is little heat capacity and it ends, a 100-volt electric light power source can be used for the power source of Nichrome heater 19A, and it is not necessary to construct electric wiring which establishes a power source in the machine room of an escalator. Therefore, working capacity can be raised also in these points.

[0039] Moreover, since the thermo switch 18 was formed in the heating means 24 and overheating of the repair iron pot 15 was prevented automatically, the precision of temperature management of the repair iron pot 15 can be kept high, therefore working capacity can be raised also in this point. Moreover, failure of the repair produced by overheating of the migration handrail 23 can be prevented, and an operator's mental burden can be made to mitigate.

[0040] Moreover, since the cooling means 24 which contains Peltier device 26 in the repair iron pot 15 was established removable, the repair part of the repair iron pot 15 and the migration handrail 23 can be cooled compulsorily in a short time. Therefore, also at this point, the time amount which temperature management of a repair activity takes can be shortened, and working capacity can be raised further.

[0041] In addition, the time amount which the repair activity per repair part of the migration handrail 23 takes can also carry out sequential repair of two or more parts by one set of the repair iron pot 15, even when it can be managed in 3 hours from 2 hours as mentioned above, therefore two or more places must be repaired within the limited time amount, such as night.

[0042]

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the perspective view showing the important section of 1 operation gestalt of the repair iron pot equipment of the migration handrail of a PAX conveyor.

[Drawing 2] It is the side elevation showing the whole 1 operation gestalt configuration shown in drawing 1 .

[Drawing 3] It is the perspective view showing the condition before implementation of the vulcanization activity done using 1 operation gestalt shown in drawing 1 .

[Drawing 4] It is the side elevation showing the condition at the time of implementation of the vulcanization activity done using 1 operation gestalt shown in drawing 1 .

[Drawing 5] It is the explanatory view showing the repair iron pot equipment of the migration handrail of the conventional PAX conveyor.

[Description of Notations]

15 Repair Iron Pot

16 Dies Body

16a Concave bend side

16b Flat side

17 Inner Mold

17a Convex surface

17b Flat side

17c Lobe

18 Thermo Switch

19 Heating Means

19A Nichrome heater

20 Plug Socket

21 Switch

22 Bolt

22a Through tube

22b Tapped hole

23 Migration Handrail

23a Handle part

24 Cooling Means

25 Fixed Piece

26 Peltier Device (Cooling Object)

27 Fan

28 Plug Socket

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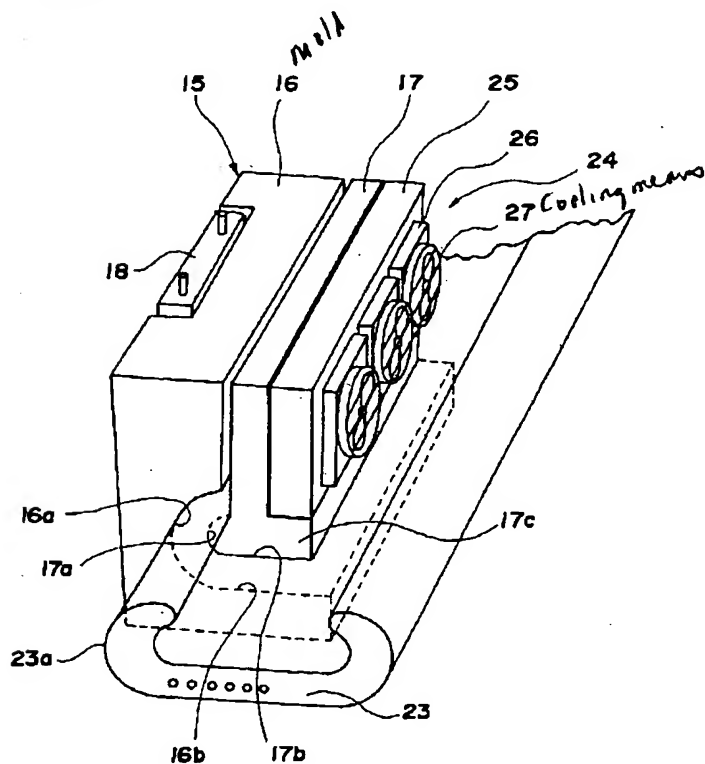
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DRAWINGS

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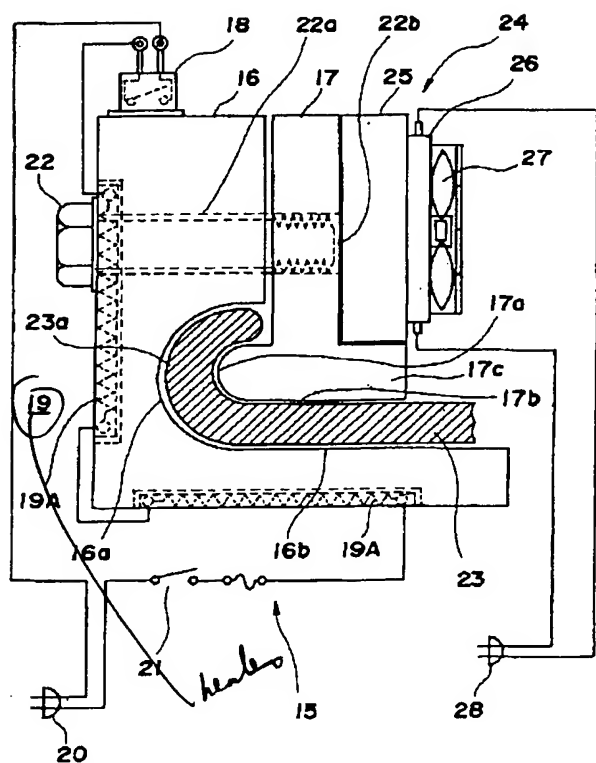
[Drawing 1]

[ 1 ]



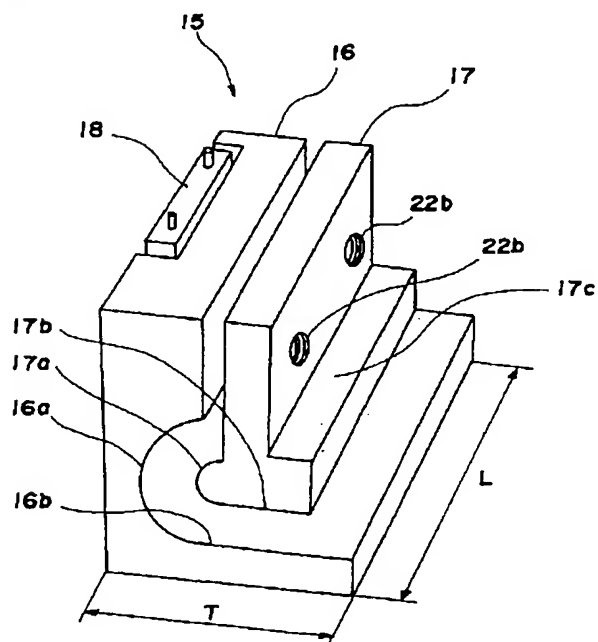
[Drawing 2]

【例 2】



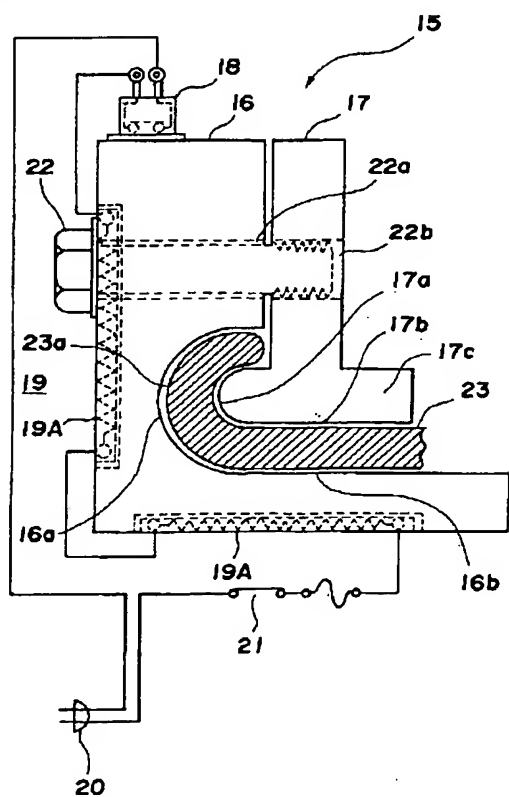
[Drawing 3]

【圖 3】



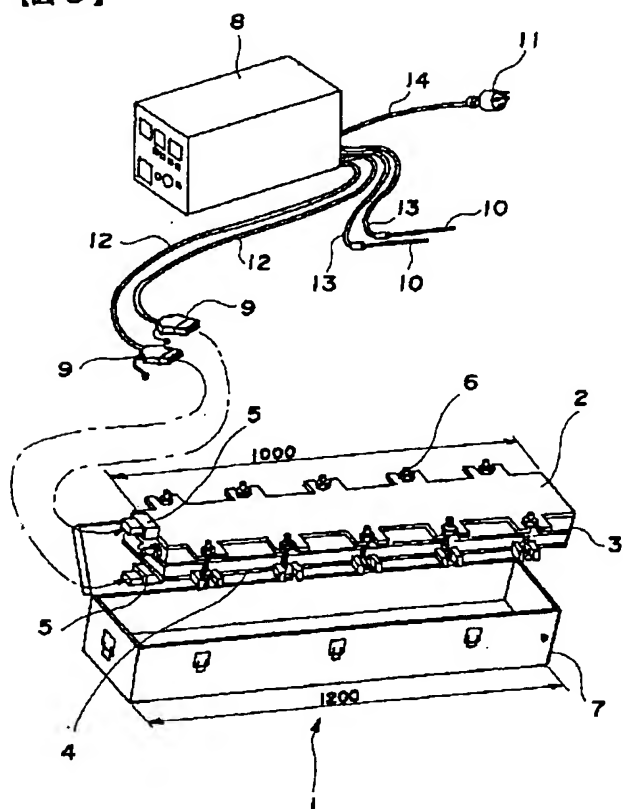
[Drawing 4]

【图 4】



[Drawing 5]

[ 図 5 ]



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